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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,071	08/01/2003	Thomas J. McIntyre	BA-00590 (1763-13-3)	6330
996	7590	03/14/2005	EXAMINER	
GRAYBEAL, JACKSON, HALEY LLP			LEPISTO, RYAN A	
155 - 108TH AVENUE NE			ART UNIT	
SUITE 350			PAPER NUMBER	
BELLEVUE, WA 98004-5901			2883	

DATE MAILED: 03/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

N.A

Office Action Summary

Application No.

10/633,071

Applicant(s)

MCLNTYRE ET AL.

Examiner

Ryan Lepisto

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-14 is/are allowed.
- 6) ☒ Claim(s) 15-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 8/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. **Claims 15, 18-19 and 22** are rejected under 35 U.S.C. 102(b) as being anticipated by **Giallorenzi (US 3,992,079)**. Giallorenzi teaches an optical integrated circuit (Fig. 1) used in an electro-optic system (and therefore, needing circuitry) (column 1 lines 9-21) comprising a substrate (10), a lower optical waveguide (11) formed over the substrate (10), a cladding layer (13) having an angled sidewall formed on the lower optical waveguide (11), a second waveguide (12) with a first interconnection region (region angled upward from waveguide (11)) formed on the lower waveguide (11) and on the angled sidewall of the cladding layer (13) to form an upper waveguide section (part of 12 above 13) with all of waveguide (11) and waveguide (12) having the same material (same refractive index) and comprises a single structure (column 2 lines 12-24).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 23 and 24** rejected under 35 U.S.C. 103(a) as being unpatentable over Giallorenzi.

Giallorenzi teaches the integrated circuit waveguide with the limitations described above used to reject claims 15, 18-19 and 22.

Giallorenzi does not teach expressly input and output devices coupled to the circuitry of the waveguide or electronic components coupled to the circuitry.

At the time the invention was made, it would be obvious to a person of ordinary skill in the art to couple input, output and electronic devices to an integrated waveguide as needed. Applicant has not disclosed that the limitations of claims 23 and 24 provide an advantage, is used for a particular purpose, or solve a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the integrated circuit as taught by Giallorenzi because there is teaching of coupling to other electrically devices as needed for the particular application and since the system circuitry is not a critical aspect of the applicant's invention.

The motivation would have been to increase the applications the integrated waveguide may be used in, including filtering and tunable coupling (column 1 lines 5-50).

3. **Claims 16-17 and 20-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Giallorenzi, **Tien (US 3,948,583)** and **Kawahima (US 5,124,543)**.

Giallorenzi teaches the integrated circuit waveguide with the limitations described above used to reject claims 15, 18-19 and 22.

Giallorenzi does not teach expressly the waveguide comprising silicon oxynitride, the cladding layer comprising silicon dioxide or the angled sidewall having an angle less than 50 degrees.

Kawahima teaches an integrated optical circuit (Fig. 3) comprising a core (2) made of silicon oxynitride (column 10 lines 4-5). Tien teaches an integrated optical waveguide (Fig. 3) comprising a less than 50 degree sloped (see the slope labeled 60:1 is the angle from the clad to the horizontal, while the clad to the horizontal would be less) cladding (12) comprising silicon dioxide (column 2 lines 56-57).

Giallorenzi, Kawashima and Tien are analogous art because they are from the same field of endeavor, integrated circuits comprising optical waveguides on substrates.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the materials as taught by Kawashima and Tien to meet the requirement of Giallorenzi that the refractive index of the core be greater than the refractive index of the cladding, as the two materials were well known in the art at the time of the invention. Also, it would have been obvious to a person of ordinary skill in the art to use a gentle slope for the coupling region of the waveguides

The motivation for doing so would have been to ensure light is contained in the waveguides by having the index of refraction of the core larger than the index of refraction of the cladding and to ensure a signal is not lost at the coupling region by having a gentle taper (Tien, column 3 lines 3-6).

Allowable Subject Matter

4. Claims 1-14 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

With regard to claims 1 and 10: These claims are allowable over the prior art of record because the latter, either alone or in combination, does not disclose nor render obvious a method of optically interconnecting layers in an optical integrated circuit including a substrate by forming a first optical transmission layer over the substrate, forming a first cladding layer on the first optical transmission layer, removing portions of the first cladding layer to form an angled sidewall in the first cladding layer and forming an optical interconnect layer on the angled sidewall of the first cladding layer and on an exposed portion of the first optical transmission layer or by removing portions of the first transmission layer and forming a first dielectric layer in the void, removing portions of the first dielectric layer to planarize upper surfaces of the layer in the void regions and forming a first cladding layer on the planarized surface, forming mesa structures on the first cladding, removing the mesa structure to form the angled sidewall and forming a

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second optical transmission layer on the angled sidewall, in combination with the rest of the claimed limitations.

With regard to claims 2-9 and 11-14: These claims are allowable over the prior art of record because they depend on allowable claims 1 and 10.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following reference teach structure will similar overall geometry as the applicant's: Okaniwa (US 5,568,579), Johnson et al (US 4,372,641), Yajima (US 3,920,314), Nashimoto (US 2001/0026669 A1), Petroff et al (US 4,568,960).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Lepisto whose telephone number is (571) 272-1946. The examiner can normally be reached on M-F 7:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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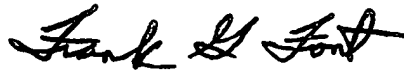
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ryan Lepisto

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Date: 3/1/05



Frank Font

Supervisory Patent Examiner

Technology Center 2800